

OPTOELECTRONICS

▲ R E P O R T ®

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From the Editors

Optoelectronics is the technology of systems and devices that emit, modulate, transmit, or sense light. Optoelectronic devices include lasers and other light sources, optics, fiberoptic components, detectors, displays, and imaging devices.

Optoelectronics Report, now incorporating *Laser Report*, covers both national and international business news and market trends and tracks technology advances to interpret their business implications.

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CLEO/QELS, PhAST break scientific barriers

BALTIMORE, MD—The Press-Only Luncheon at this year's Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science Conference & Conference on Photonic Applications, Systems and Technologies (CLEO/QELS & PhAST) was appropriately entitled "New Fundamentals: Breaking Scientific Barriers." In his opening remarks, Ben Stein from the Media & Government Relations Division of the American Institute of Physics (AIP; College Park, MD) said that only in the last ten years—thanks to the removal of certain nano-scale and attosecond-scale barriers in the photonics industry—have scientists actually been able to demonstrate such theorized classical experiments as terahertz and attosecond-scale imaging, visualization of chemi-

cal processes within the human body, and negative refraction.

The luncheon included presentations by Scott Barry of Thorlabs (Newton, NJ), who spoke about his company's 2007 PhAST/*Laser Focus World* Innovation Award-winning technology—the Thorlabs adaptive scanning optical microscope (ASOM)—which addresses the centuries-old problem of field of view and resolution tradeoff in optical microscopes. By adding a MEMS-based adaptive optic in its ASOM, Thorlabs obtains high resolution in a very large field of view and can tackle imaging tasks (such as automatically tracking a moving worm) that were once extremely difficult with conventional microscopy technologies.

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CVI goes big time with Melles Griot deal

ALBUQUERQUE, NM—The last few years have seen much consolidation in this industry, initially geared toward helping some companies move from telecom into other markets and others to leverage the market presence of veteran competitors. In one of the few cases of a smaller company taking over a larger one, in early May CVI announced its intent to purchase Melles Griot (Carlsbad, CA) for an undisclosed amount.

The new company, which will be called CVI Melles Griot, brings together two entities that have spent the last few years in the shadow of larger entities such as Coherent and Newport/Spectra

Physics. It also combines complementary product lines that have very little overlap and enables both companies to move into new markets with established brands.

"Our goal is to help our customers beat their competition to market, and this acquisition enables us (CVI and Melles Griot) to bring design, manufacturing, assembly, and testing of photonic products and optical sub-systems under one roof," said Stuart Schoenmann, CEO of CVI. "Vertical integration of the light source, optics, mechanics, and the detection systems provides a single manufacturing source, which leads to more

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NEWS BRIEFS

OSA lobbies Washington: Optical Society of America (OSA) members were on Capitol Hill earlier this month (during the CLEO/QELS conference) calling on their elected officials to support a range of science policy initiatives, including increased federal investments in scientific R&D FY2008 and innovation legislation in the House and Senate. Nearly 30 participants met one-on-one with U.S. senators and representatives and their staffs as part of the 2007 Capitol Hill Day event co-sponsored by OSA, the Optoelectronics Industry Development Association (OIDA), the American Physical Society (APS) and the Institute of Electrical and Electronics Engineers-USA Lasers and Electro-Optics Society (IEEE-LEOS).

Participants from 14 states discussed the importance of doubling federal investments in basic research for FY08 at the National Science Foundation (NSF), the Department of Energy's Office of Science and in the National Institute of Standards and Technology's (NIST) core programs. Authorizing bills for both NSF and NIST passed in the House a week prior, providing Congress with the clearance to double the budgets for the two agencies by 2010. Participants will be thanking lawmakers for their support of those important first steps to ensuring scientific R&D gets the funding it needs. Participants also encouraged lawmakers to continue to strengthen science, technology, engineering and mathematics (STEM) education, thanking them for recent bills that emphasize its importance.

Light Blue Optics, Thales partner on mini-displays

CAMBRIDGE, ENGLAND—Light Blue Optics is partnering with Thales (Cedex, France) to develop military and aerospace displays. Light Blue will provide Thales with miniature projection systems for cockpit advanced displays. According to the company, Light Blue's holographic laser projection technology delivers large, full-color video images in focus at all distances, even on curved or angled surfaces.

"This development is a strategic collaboration that will bring Light Blue's unique command of holographic laser projection together with Thales's unrivalled understanding of human interaction with information display systems," said Light Blue Optics' CEO, Chris Harris. "Coupling our flexibility with Thales's tremendous engineering capacity opens up a range of near-term opportunities in aerospace and defense, and we anticipate it will form the basis of a long-term relationship."

According to Edward Buckley, Light Blue's director of business development and co-founder the company's proprietary projection technology provides a range of benefits, including exceptional levels of brightness and a robust, lightweight optical architecture that is highly tolerant to a range of microdisplay defects.

"Such differentiating advantages

make our technology ideal for use in safety critical markets such as aerospace and defense and automotive," he added.

Bruno Vazzoler, VP and general manager of Cockpit Interactive Solutions at Thales, noted that his company is always on the lookout for leading-edge technologies with ground-breaking capabilities.

"We have identified a range of early revenue opportunities for Light Blue's technology and look forward to delivering these advances in display technology to customers in the near term," he said.

Last month, Light Blue Optics announced another development deal with the microdisplay manufacturer Displaytech (???). Under the exclusive partnership agreement, Displaytech will develop and manufacture an ultra-compact, highly efficient and low cost microdisplay device exclusively for Light Blue Optics. According to the companies, the development partnership combines Displaytech's experience with fast switching Ferroelectric Liquid Crystal on Silicon (FLCOS) technologies with Light Blue Optics' innovative miniature projection technology. Displaytech has shipped more than 16 million devices to some of the world's premier consumer electronics companies and has more than 100 granted, licensed, and pending patents to its name.

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Laser pioneer Ted Maiman dies at 79

VANCOUVER, BC, CANADA—May 16 marks the 47th anniversary of the invention of the first working laser. This year, good friends of that laser's inventor, Ted Maiman, plan to gather at Simon Fraser University (SFU; Burnaby, British Columbia, Canada) to celebrate his life and accomplishments. He died on May 5, two months shy of his 80th birthday, of a rare genetic blood disorder after a lengthy stay in a Vancouver hospital.

Andrew Rawicz, a professor in the School of Engineering Science at SFU, emphasized that the May 16 gathering will not be a memorial service but a celebration. "People like that never really die," he said. The tribute will also mark a first step in establishing a commemorative archive and scholarship funds for Maiman at SFU, where Maiman received one of his many honorary degrees and served as an adjunct professor in the school of engineering, playing a key role in establishing a program in biomedical engineering and biophotonics. Plans are to establish a Maiman Foundation for the archive at SFU, as well as two scholarship funds: an Abe & Ted Maiman Scholarship related to the application of lasers in medicine, and a Sherri Maiman Scholarship in psychology, named for Maiman's daughter who died prior to completing a PhD in psychology.

Maiman was born in 1927 and raised in Denver, CO. He earned a B.S. degree in engineering physics in 1949 at the University of Colorado. Two years later he attended Stanford University and obtained a master's degree in electrical engineering followed by a doctorate in physics in 1955. At Stanford, Maiman studied under the theoretician Willis Lamb, who received the Nobel Prize in physics in 1955, months after Maiman received his doctorate.

In 1960 Maiman invented the first functioning laser while working at Hughes Aircraft Company. Hughes's managers had previously assigned Maiman to build a more practical version of the maser using microwave emission

from chromium atoms in synthetic ruby crystals. In 1962 Maiman established his own enterprise, Korad Corporation, which undertook the development and manufacture of lasers. In 1968, after selling the company to Union Carbide Corporation, Maiman founded Maiman Associates. In addition to his academic positions, he was most recently a director of Control Laser Corporation and a member of the advisory board of *Industrial Research Magazine*.

Maiman is the author of the basic patent on the ruby laser and a number of patents on masers, lasers, laser displays, optical scanning, and modulation. He was twice nominated for the Nobel Prize and was given membership in both National Academies of Science and Engineers. He was also a recipient of 1983/1984 Physics Prize, the same year he was inducted into the National Inventors Hall of Fame. Three years later he became laureate of the prestigious Japan Prize, the Asian equivalent of the Nobel Prize. He was a member of both the National Academy of Sciences and the National Academy of Engineers, and was a Fellow of the American Physical Society, the Optical Society of America, and the Society of Photo-Optical Instrumentation Engineers.

Maiman is survived by his wife, Kathleen, as well as other relatives and nephews in Denver, CO, and Los Angeles, CA. Cards and condolences, which will be included in the Maiman Archive, should be sent to the School of Engineering Science, Simon Fraser University, Burnaby, British Columbia, V5A1S6, Canada, Attention: Andrew Rawicz. For more information on evolving plans for the Maiman Foundation and scholarship funds, contact Andrew Rawicz at rawicz@sfu.ca.

—Hassaun Jones-Bey

NEWS BRIEFS

JDSU buys Innocor: JDSU (Milpitas, CA) signed an agreement to purchase Ottawa, Canada-based Innocor, a provider of broadband test solutions for network equipment manufacturers. Innocor's products complement JDSU's existing Lab and Production test solutions and will be integrated with JDSU's Communications Test and Measurement (CommTest) business, one of the leading providers of test solutions for the research and development, service verification testing and production needs of network equipment manufacturers. Financial terms of the transaction were not disclosed and JDSU expects to complete the acquisition by the end of June.

Innocor expands JDSU's product portfolio for the lab and production test market by capitalizing on a number of key assets, including Innocor's successful TestPoint product family; the close customer relationships Innocor has with leading network equipment manufacturers worldwide; JDSU's strong product development capabilities; and JDSU's global direct sales organization and other distribution channels.

In a related development, JDSU appointed Bill Mortimer as vice president and general manager of JDSU CommTest's Lab and Production division, overseeing the company's fiber optic, optical transport, and Innocor business units. Mortimer brings more than 20 years of communications test experience, including 13 with Agilent Technologies/Hewlett-Packard.

NEWS BRIEFS

USDA grants: Ekips Technologies (Norman, OK) has been awarded two Phase I United States Department of Agriculture (USDA) research grants for the application of laser technology to agricultural problems. Ekips is developing disease detection systems that involve measuring gas phase biomarkers in exhaled breath. In partnership with Oklahoma State University (Stillwater, OK), Ekips is currently working on an extended Small Business Innovative Research Phase II research program for the initial disease application, bovine respiratory disease. The new Phase I application will expand this work to additional biomarkers associated with infectious diseases.

Ekips also announced another USDA grant supporting the use of laser based instrumentation for cattle feed yard emissions monitoring. The feed yard environmental monitoring project is a collaborative effort with Rice University (Houston, TX).

"Our research partners have developed cost effective laser sensors that we are applying to environmental emissions monitoring applications to assess potentially harmful formation of particulate matter in air," said Chad Roller, vice president of research at Ekips.

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CVI goes big time with Melles Griot deal, continued from page 1

highly integrated solutions (and) improves quality, performance, and service to the customer."

Schoenmann added that it was also important for some of CVI's U.S. customers that the company have domestic ownership and control over various technologies and products, such as robust environmental performance through dense coating technologies and improved wavefront quality. The combined company also benefits from a complementary geographic fit.

"Over the years, CVI has established Asian manufacturing facilities, acquired two companies in Europe (Technical Optics and Quality Laser Optics), and acquired two companies in the United States (Optical Components and, now, Melles Griot, which has a strong presence in Japan)," Schoenmann said. "These actions have enabled us to expand our geographic footprint to provide local direct sales support and manufacturing to our customers."

This deal also benefits Melles Griot on several levels. Its former parent company, Barloworld Ltd. (Johannesburg, South Africa), had made it clear for the past year that it was interested in divesting Melles Griot, of which it acquired majority share in 1988. After years as a huge conglomerate involved in markets as diverse as cement, mining, earth moving equipment, automobile dealerships, home improvement, steel, paint, and, of course, optoelectronics, Barloworld wants to focus on industrial distribution and logistics and move away from manufacturing, according to Lynn Strickland, VP of Business Development for Melles Griot.

"Barloworld made a decision to get out of manufacturing because it was not producing the types of return on investment they were seeking," he said. "A few years back they were expanding into everything. Then they did a strategic analysis of share price and found that large conglomerates seldom command the highest share prices."

According to Strickland, the Melles Griot executive team has known since

last summer that this was Barloworld's plan, and he says the company was "shopped around a bit".

"We were very happy when CVI came up because there were other potential acquirors out there who would have bought us and dissolved the company," he said. "But with CVI, they are in our space, we are strategically aligned, and the management structure understands the driving forces in our industry."

Strickland also notes that there is a lot of "synergistic opportunity" for the newly combined company in the optics and catalogue space as well as the laser business.

"The laser business makes up almost half of Melles Griot, and CVI is not in that space at all," he said. "So this adds on to their portfolio and gives them an immediate presence in the laser market. In addition, they manufacture a lot of laser-related optics so there are some vertical integration opportunities."

Both Schoenmann and Strickland felt it was premature to discuss any potential changes to the management team and employee base of Melles Griot. They also felt it was premature to discuss any potential changes to the various Melles Griot facilities, including the company's headquarters in Carlsbad.

"In the interest of efficiency the combined facilities will be examined with a focus on maximizing synergies," Strickland said. "CVI has some equipment they are not utilizing that they plan to move into Melles Griot facilities, and vice versa. We will also be sharing some best practices."

Schoenmann confirmed that CVI—whose financial backing comes from Norwest Equity Partners (Minneapolis, MN), which acquired CVI Laser in 2003—is actively looking at additional acquisitions going forward.

"Strategic acquisitions will enable us to provide new and improved products, rapid turnaround times, and even faster times to market, which will enable our customers to beat their competition to the market," he said.

—Kathy Kincade

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Company	Ticker	Apr. 30	May 14	52-week	
				Low	High
Agilent	A	34.61	35.91	26.96	38.55
Alcatel-Lucent	ALU	13.24	13.41	10.63	15.43
APA Optics	APAT	1.21	1.30	1.13	2.25
Avanex	AVNX	1.77	1.58	1.22	2.38
Bookham	BKHM	2.29	2.40	2.08	4.62
Ciena	CIEN	30.16	29.53	22.04	33.67
Coherent	COHR	31.64	29.75	28.84	37.80
Corning	GLW	24.12	23.34	17.50	25.70
Cree	CREE	20.34	19.07	15.25	29.60
Cymer	CYMI	40.81	41.73	33.75	50.72
Dalsa*	DSA.TO	12.34	12.29	11.45	15.99
Data Translation	DATX	0.51	0.75	0.30	1.01
Eastman Kodak	EK	25.07	24.21	18.93	27.57
Electro Scientific	ESIO	21.12	20.56	17.23	22.93
Emcore	EMKR	5.23	4.88	3.84	11.76
Enablence Tech.	ENAFF.PK	1.31	1.13**	N/A	N/A
Excel Tech.	XLTC	26.91	27.16	24.55	29.97
EXFO	EXFO	6.71	6.30	4.80	8.80
GSI Group	GSIG	10.12	10.18	7.82	10.75
II-VI	IIVI	28.05	28.51	16.80	36.42
Infineon	IFX	15.70	14.88	10.24	16.38
IPG Photonics	IPGP	18.10	20.03	17.67	28.00
ITT Industries	ITT	64.54	66.01	45.34	66.84
JDS Uniphase	JDSU	16.80	13.59	13.51	25.36
JMAR Tech.	JMAR.OB	0.19	0.17	0.12	0.94
Lightpath Tech.	LPTH	5.48	5.34	3.01	7.18
LSI Industries	LSI	8.59	8.32	7.41	11.08
MRV Comm.	MRVC	3.56	3.35	2.00	4.50
Nanometrics	NANO	6.58	6.23	5.74	12.73
Newport	NEWP	15.89	15.91	13.94	22.83
Nortel Networks	NT	23.40	23.81	19.00	31.79
Omnivision	OVTI	14.18	14.45	11.00	31.19
PerkinElmer	PKI	24.39	25.13	16.31	26.44
QPC Laser	QPCI.OB	1.31	1.20	0.90	3.05
Rofin-Sinar	RSTI	67.34	68.86	49.31	70.63
Thermo Electron	TMO	52.89	53.38	33.85	53.90
Three-Five Systems	TFSI.PK	0.10	0.10	0.07	0.30
Universal Display	PANL	15.95	15.56	9.25	18.34
Veeco Instruments	VECO	18.65	17.59	17.59	25.52
Zygo	ZIGO	16.01	15.09	11.95	17.65

*Figures quoted in Canadian dollars.

**Enablence Tech. last traded 5/10/07.

N/A—Not available.

All information is believed to be accurate at the time of publication, but *Optoelectronics Report* is not responsible for errors.

NEWS BRIEFS

New CEO: The Board of Directors of II-VI named Francis J. Kramer to succeed Carl J. Johnson as CEO of the company, effective July 1, 2007. Johnson will remain an executive of the company, serving as its Chairman of the Board. Kramer has spent more than two decades at II-VI after joining the company in 1983 as Vice President and General Manager of Manufacturing. He was named Executive Vice President and General Manager of Manufacturing in 1984 until he was promoted again in 1985 to President and COO. He will continue to serve as President in addition to CEO.

Strategic suppliers: Aurora Systems (Westlake Village, CA), a leader in the design and production of high performance LCOS microdisplay products, and HOLO-EYE Systems (Laguna Hills, CA), integrators of microdisplay technology, have formed a strategic supply agreement to serve specialty markets. ASI will provide LCOS products for consumer electronic applications, while HSI will market Aurora products to specialty applications such as defense, biotech, and industrial applications. HSI will use its expertise to address a wide range of applications such as head-mounted displays, head-up displays, optical metrology, bio-photonics, and optical networking applications. HSI has also been instrumental in the joint development of phase modulating LCOS microdisplays for use in phase shifting applications such as dynamic diffractive optics and digital holography.

NEWS BRIEFS

Education grant: SPIE

(Bellingham, WA) recently awarded a \$3000 grant to the New England Board of Higher Education's (NEBHE) Project PHOTON2, a curriculum and professional development venture funded by the Advanced Technological Education (ATE) program of the National Science Foundation (NSF). SPIE has been an active partner with NEBHE, providing services and activities that support the more than 30 high schools and colleges nationwide that are part of Project PHOTON2. With an emphasis on two-year colleges, the ATE program focuses on the education of technicians for the high-technology fields that help drive the nation's economy. The program involves partnerships between academic institutions and employers to promote improvement in the education of science and engineering technicians at the undergraduate and secondary school levels.

Development contract: General Dynamics Land Systems (Sterling Heights, MI) has awarded Lytron (Woburn, MA) the design and development contract for the U.S. Army's Future Combat Systems (FCS) Manned Ground Vehicle (MGV) Propulsion Heat Exchanger Packs (PHEP). FCS is the Army's premier modernization program, comprising a networked family of unmanned air vehicles and sensors, and both manned and unmanned ground vehicles that will enable soldiers to perform their missions safely and more effectively. The PHEP will provide liquid cooling to the MGV propulsion system and electronics. The heat exchangers will leverage Lytron's standard plate-fin heat exchanger technologies. The PHEP contract is valued at over \$1 million.

CLEO/QELS, PhAST break scientific barriers, continued from page 1

Boasting a record year for paper submissions, CLEO/QELS & PhAST 2007 treated its 5200 attendees to over 1800 technical presentations and more than 250 exhibitor booths to highlight the barrier-breaking field of lasers and photonics. There were more than 200 technical sessions and 200+ exhibitor booths to highlight the barrier-breaking field of lasers and photonics. While negative refraction in the visible may not yet enable the "cloaking" of objects, and while terahertz imaging may still require some detector improvements before large-scale deployment, there is a feeling in the photonics community that such capabilities are no longer impossible but probable.

In the Wednesday morning plenary session for the CLEO portion of the conference, William Philips from the National Institute of Standards and Technology (NIST; Gaithersburg, MD) discussed "Spinning Atoms with Light." The advent of the laser and its subsequent improvement to ultrafast speeds and custom beam profiles makes it possible to illuminate a cloud of atoms (a Bose-Einstein condensate, or BEC) with two laser beams and transfer the orbital and angular momentum of the laser to the BEC cloud. This BEC vortex creates a toroidal trap and can be used to manipulate individual atoms using light—a feat that has applications in optical tweezers, atom optics, and quantum information processing.

New products

Femtolasers (Vienna, Austria) exhibited its Femtopower Pro CEP (carrier envelope phase) stabilized ultrafast amplifier that includes a difference-frequency-generation femtosecond oscillator that generates sub-7 fs pulses; the amplifier rebroadens the spectrum and recompresses the pulses to a pulse energy of 300 μ J or greater at sub-7 fs pulse durations. Coherent (Santa Clara, CA) also showed a CEP stabilized ultrafast laser, the Micra-CEP. The Coherent laser's CEP detection module uses a photonic-crystal fiber to generate an octave-spanning optical spectrum. The red end of the spectrum is frequency-dou-

bled and combined with the green end; the resultant beat frequency is sensed by a fast photodetector that provides the CEP feedback signal, used to control a fast cavity-mirror actuator to control the carrier phase. Uses of these lasers include attosecond pulse generation, high-harmonic generation, coherent terahertz generation, optical clocks, and other applications.

KMLabs (Boulder, CO) introduced its Wyvern ultrafast regenerative laser amplifier—a single-box system that uses patented downchirped pulse amplification (DPA) to enable sub-50 fs pulses from 50–200 kHz with m-squared less than 1.3. And to measure those pulses, Spectrum Detector (Lake Oswego, OR) debuted its analog joulemeters and digital USB joulemeters as well as its family of optical trap detectors with spectral ranges from 0.2 to 1.1 μ m.

HoloChip (Palo Alto, CA) showed a fluid-based lens that is continuously variable in focal length from infinity to approximately 50 mm; the lens contains a fluid that is held by a flexible membrane. The prototype had a clear-aperture diameter of about 10 mm, but the technology is scalable up to 25 mm diameters and down to less than a millimeter. While suitable for uses such as cell-phone cameras, the lens is rugged and simple enough to be used as a general singlet lens in the laboratory. The wavefront quality is currently half-wave peak-to-valley, and is being improved.

But the most tangible new products on display at CLEO/QELS & PhAST had to be the fully functional demonstration of the Thorlabs ASOM, as well as an improved T-Ray Model 4000 hand-held or table-top capable time-domain terahertz system from Picometrix (Ann Arbor, MI), which operates from 0.02 to 2 THz and includes software for time domain, fast Fourier transform, and absorbance analysis of samples under test.

Next year

Starting in August 2007, researchers and developers can begin submitting papers to CLEO/QELS & PhAST 2008, which will be held from May 4–9 in San Jose, CA.

—Gail Overton & John Wallace